Serial No. 09/756,453
Docket ADO 0069 PA

Sub C4 cont.
B3

25. (New) In combination, a heat activated expandable sealant and a flow control agent on at least a portion of said sealant, said combination adapted to seal a gap or cavity in a component of up to 100 mm in width; wherein said heat activated expandable sealant and said flow control agent melt and flow upon heating to a temperature sufficient to cause said sealant and flow control agent to flow; and wherein said heat activated expandable sealant has a melt flow rate which is higher than the melt flow rate of said flow control agent.

REMARKS

Applicants initially wish to confirm the election of Group III, claims 15-19.

In the first Office Action, claims 16-18 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite. The Examiner asserts that the term "modified polyethylene" renders the claim indefinite. However, applicants submit that this term would be understood by one skilled in the art. As defined in Hawley's Condensed Chemical Dictionary (copy of definition enclosed), the term "modification" refers to "a reaction in which the substituent radicals of a polymer are replaced by other chemical entities, resulting in a marked change in one or more properties of the polymer without destroying its structural identity." Applicants further refer the Examiner to the specification at page 4, in which commercially available expandable sealants are identified which contain a modified polyethylene. Accordingly, it is believed that one skilled in the art would understand the limitations of the claims.

Regarding claim 17, the Examiner asserts that the phase "a polyvinyl acetate" is unclear. Applicants have now amended the claim to remove the word "a". The meaning of the term "polyvinyl acetate" is believed to be clear, i.e., a polymer formed by the polymerization of vinyl acetate, and would understood by one skilled in the art. The Examiner further asserts that there is insufficient antecedent basis for the phrase "flow

control agent coating". Applicants have now amended claim 17 to remove the term "coating". Claim 17 is now believed to be clear and in compliance with §112.

Finally, the Examiner asserts that the term "thermoformed part" renders the claim indefinite. However, applicants submit that the term is well known in the art and would be understood by one skilled in the art. See the enclosed definition of thermoforming.

Claims 16-18 as amended are now believed to be in compliance with §112.

Claims 15, 18, and 19 have been rejected under 35 U.S.C. 102(e) as being anticipated by Johnson et al. Johnson et al. teach the use of a melt-flowable sheet material to seal metal joints, for example, in automobiles, to provide an aesthetic surface which may then be painted. The Examiner refers to Johnson's teaching of a woven or non-woven scrim in conjunction with his melt-flowable material. However, as acknowledged by the Examiner, the scrim is positioned **between** multiple layers of melt-flowable material. Johnson et al. do not teach or suggest the use of a flow control agent which covers a sealant as taught in the present invention. Applicants further wish to point out that the use of the scrim in Johnson et al. is for the purpose of **restricting** flow of the sealant to a desired area of the substrate. In the present invention, the flow of the sealant is not restricted by the flow control agent, but rather is **controlled** so that it does not sag excessively when used to seal wide gaps or holes.

While applicants note that Johnson et al. also teach the use of thermoset or thermoplastic films to cover their sealant, the use of such films is again for the purpose of restricting flow. See, e.g., claim 1 of Johnson et al. which recites that the film **confines** the melt-flowable composition to the desired area of the surface of a substrate. Applicants further note that the film **does not melt and flow** when heated to the temperature which causes the melt-flowable composition to flow. See claim 1 of Johnson et al. This teaching is clearly in contrast to the present invention, in which both the sealant and flow control agent flow upon heating, only at different melt flow rates. See claim 15 as amended.

Further, Johnson et al. do not teach or suggest the use of a heat expandable sealant and flow control agent for the purpose of sealing a gap or cavity which is up to 100 mm wide as recited in new claim 25. While Johnson et al. teach that their melt-flowable sheet material may be used to fill in gaps, such gaps are between joints. See col. 6, lines 13-14, and Figs. 1c and 3c. There is no teaching or suggestion in Johnson et al. that their melt-flowable sheet material may be used to seal wide gaps as taught and claimed by applicants.

Further, applicants wish to point out that Johnson et al. do not teach a flow control agent in the form of a dry coating as recited in new claim 24. Claims 15-19 as amended, and new claims 21 to 25 are believed to be clearly patentable over Johnson et al.

Claim 16 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson et al. in view of Bien et al. The Examiner concedes that Johnson et al. do not teach the sealant composition of claim 16, but states that Bien et al. disclose the use of a RuVan expandable sealant, and that it would have been obvious to use such a sealant in the method of Johnson et al. However, neither Bien et al. nor Johnson et al. teach or suggest the use of a such a sealant with a flow control agent which melts and flows at a lower rate than the sealant as claimed. Bien et al. teach the use of a mesh netting with the sealant which **restricts** flow of the sealant. There is no teaching or suggestion in Bien et al. that their mesh netting melts and flows as claimed, or that their sealant has a higher melt flow rate than the mesh netting. As both Johnson et al. and Bien et al. teach the use of mesh or scrim which restricts the flow of the sealant, even if one were to use the sealant of Bien et al. in Johnson et al., the claimed combination would not result.

Claim 17 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson et al. in view of Daponte. Daponte discloses a method of forming nonwoven elastomeric webs using ethylene vinyl acetate copolymers. The Examiner asserts that

Serial No. 09/756,453
Docket ADO 0069 PA

it would have been obvious to use a web or scrim comprised of ethylene-vinyl actetate copolymers as taught in Daponte in the invention of Johnson et al. However, there is no teaching or suggestion in Daponte that such a web could be used to control the flow of an expandable sealant. Nor is there any teaching or suggestion in Daponte that such a web would have a melt flow rate which is lower than that of an expandable sealant. Further, Daponte does not teach or suggest the specific use of polyvinyl acetate as a flow control agent as recited in claim 17.

For all of the above reasons, applicants submit that claims 15-19, as amended, and new claims 21-25 are patentable over the cited references. Early notification of allowable subject matter is respectfully requested.

Respectfully submitted,

KILLWORTH, GOTTMAN, HAGAN
& SCHAEFF, L.L.P.

By Susan M. Luna
Susan M. Luna
Registration No. 38,769

One Dayton Centre
One South Main Street, Suite 500
Dayton, Ohio 45402-2023
Telephone: (937) 223-2050
Facsimile: (937) 223-0724

SML/

Serial No. 09/756,453
Docket ADO 0069 PA

APPENDIX
VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

15.(Amended) In combination, a heat activated expandable sealant and a flow control agent on at least a portion of said sealant, said combination adapted to seal a gap or cavity in a component; wherein said heat activated expandable sealant and said flow control agent melt and flow upon heating to a temperature sufficient to cause said sealant and flow control agent to flow; and wherein said heat activated expandable sealant has [having] a melt flow rate which is higher than the melt flow rate of said flow control agent.

17. (Amended) The combination of claim 15 wherein said flow control agent [coating] comprises [a] polyvinyl acetate.

Hawley's Condensed Chemical Dictionary

TWELFTH EDITION

Revised by

Richard J. Lewis, Sr.

VNR VAN NOSTRAND REINHOLD COMPANY
New York

plastics, etc.
61% sulfuric

r liberate dan-
irritant by in-
: NO_x poison-

sion of liquid,
' a mixture by
L w-viscosity
with impellers
The mixing ac-
act of the im-
om the turbu-
in the outer
son, the diam-
dy from ne-
ainer. For liq-
ng paddles of
: mixtures in-
in closed con-
-like members
liquids of very
ia blades, and
ecause turbu-
:h fluids, the
: walls of the
ith every part
le most indus-
rials is done
mixers, etc.,
also be effec-
compartments
iose pitch and
as to provide
re are a num-
s of these for
ucts, and sim-
s are mixed in
els.
, muller.

f isomers hav-

association of
esented by a
; may or may
an usually be
quids that are
lutions. Mix-
s indicated by

Natural	Artificial
marble	plastics
wood	cermets
latex	alloys
vegetable oils	
sea water	

See also compound, blend, solution, mixing.

MKP. Abbreviation for monopotassium phosphate.
See potassium phosphate, monobasic.

mL. Abbreviation for milliliter.

MLA. Abbreviation for mixed lead alkyls.

mm. Abbreviation for millimeter.

MMH. Abbreviation for monomethylhydrazine.

Mn. Symbol for manganese.

Mo. Symbol for molybdenum.

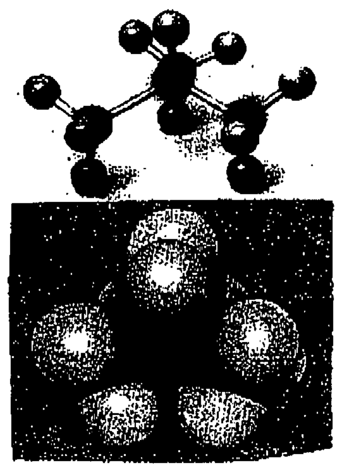
mobility. The ease with which a liquid moves or flows. Hydrocarbon liquids (nonpolar) that have low viscosity, surface tension, and density respond more readily to an applied force than does water (a polar liquid). For this reason, fires involving hydrocarbon liquids should be extinguished with foam rather than with a direct stream of water.

"Moby Dick" [*Smith*]. TM for synthetic fatty alcohol esters.
Use: Replacements for filtered sperm whale oil.

MOCA. See 4,4'-methylenebis(2-chloroaniline).

modacrylic fiber. A manufactured fiber in which the fiber-forming substance is any long-chain synthetic polymer composed of less than 85% but at least 35% by weight of acrylonitrile units, $-CH_2CH(CN)-$ (Federal Trade Commission). Other chemicals, such as vinyl chloride, are incorporated as modifiers. Characterized by moderate tenacity, low water absorption, and resistance to combustion; self-extinguishing.
Use: Deep pile and fleece fabrics, industrial filters, carpets, underwear, blends with other fibers.
See also acrylonitrile, acrylic fiber.

model. A representation, either abstract or physical, of a system, arrangement, or structure that cannot be perceived objectively. (1) A mathematical model is one in which all or most of the parameters of a complex system such as an ocean are assigned symbolic values that can be utilized to give a theoretical approximation of actuality. Such models are useful in physical chemical analyses. (2) A space-lattice model is a 3-dimensional duplication of the shape and structure of a crystal in which the atoms comprising the lattice are plastic spheres or balls connected by rods to represent bonds. (3) A molecular model is similar, except that it represents an individual chemical compound rather than a crystal. The spheres are made to scale based on the known diameter of the atoms represented; they are often colored to suggest the nature of the element (black for carbon, white for hydrogen, red for halogens, etc.). In one type, both single and double bonds are plastic rods that join the spheres at appropriate angles; in another the spheres are fused in clusters. The two types are illustrated by the models of isobutane shown; a clustered model of the DNA molecule is shown in the entry on deoxyribonucleic acid. Both space-lattice and molecular models are useful for classroom demonstration.



moderator. A substance of low atomic weight, such as beryllium, carbon (graphite), deuterium (in heavy water), or ordinary water, which is capable of reducing the speed of neutrons but which has little tendency toward neutron absorption. The neutrons lose speed when they collide with the atomic nuclei of the moderator. Moderators are used in nuclear reactors, because slow neutrons are most likely to produce fission. A typical graphite-moderated reactor may contain 50 tons of uranium for 472 tons of graphite. Reactors in the U.S. are cooled and moderated with light water.

modification. A chemical reaction in which some or all of the substituent radicals of a high polymer are replaced by other chemical entities, re-

sulting in a marked change in one or more properties of the polymer without destroying its structural identity. Cellulose, e.g., can be modified by substitution of its hydroxyl groups by carboxyl or alkyl radicals along the carbon chain. These reactions are usually not stoichiometric. Their products have many properties foreign to the original cellulose, e.g., water solubility, high viscosity, gel- and film-forming ability. Other polymeric substances that can undergo modification are rubber, starches, polyacrylonitrile, and some other synthetic resins.
See also cellulose, modified.

modulus of elasticity. (elastic modulus). A coefficient of elasticity representing the ratio of stress to strain as a material is deformed under dynamic load. It is a measure of the softness or stiffness of the material (Young's modulus).

moellon degras. See degras.

mohair. A natural fiber, similar to wool, obtained from angora goats.
Properties: Tenacity 14 g/denier. Combustible.
Use: Fabrics for outer clothing, draperies, upholstery.

Mohr's salt. See ferrous-ammonium sulfate.

Mohs scale. An empirical scale of the hardness of mineral or mineral-like materials originally consisting of 10 values, ranging from talc, with a rating of 1, to diamond, with a rating of 10, the rating being based on the ability of each material to scratch the one directly below it in the series. The number of materials has been expanded from 10 to 15 with the addition of several synthetically produced substances (e.g., silicon carbide) between the original 9–10 positions. The scale is named after the German mineralogist, Friedrich Mohs (1773–1839).
See also hardness (1).

moiety. An indefinite portion of a sample.

Moissan, Henri. (1852–1907). A native of Paris, Moissan was a professor at the School of Pharmacy from 1886 to 1900 and at the Sorbonne from 1900 to 1907. At the former institution, he first isolated and liquefied fluorine in 1886 by the electrolysis of potassium acid fluoride in anhydrous hydrogen fluoride. His work with fluorine undoubtedly shortened his life, as it did that of many other early experimenters in the field of fluorine chemistry. He won great fame by his development of the electric furnace and pioneered its use in the production of calcium carbide, making acetylene production and use commercially feasible, in the preparation of pure metals, such as magnesium, chromium, uranium, tungsten, etc,, and in the production of many new compounds, e.g., silicides, carbides and refractories. In 1906, he was awarded the Nobel prize in chemistry.

molal. A concentration in which the amount of solute is stated in moles and the amount of solvent in kilograms. The unit of molality is moles of solute per kilogram of solvent and is designated by a small m, 1 mole of NaCl in 1 kg of solvent is a-1 molal concentration.
Note: Do not confuse with molar.

molar. A concentration in which 1 molecular weight in grams (1 mole) of a substance is dissolved in enough solvent to make one liter of solution. Molarity is indicated by an italic capital *M*. Molar quantities are proportional to the molecular weight of the substances.

molasses. The thick liquid left after sucrose has been removed from the mother liquor in sugar manufacture. Blackstrap molasses is the syrup from which no more sugar can be obtained economically. It contains approximately sucrose 20%, reducing sugars 20%, ash 10%, organic nonsugars 20%, water 20%. Combustible.
Use: Feed, food, raw material for various alcohols, acetone, citric acid and yeast propagation. Sodium glutamate is made from Steffens molasses, a waste liquor from beet sugar manufacture.
See also fermentation.

mold. See fungus.

mold preventive. See mildew preventive.

molding. Forming a plastic or rubber article in a desired shape by application of heat and pressure, either in a negative cavity, usually of metal, or in contact with a contoured metal or phenolic resin surface.
See injection molding, blow molding, compression molding.

molding powder. A mixture in a granular or pelleted form of a plastic base material together with necessary modifying ingredients (filler, plasticizer, pigment, etc.). Such mixtures are normally prepared by resin manufacturers and sold as such to processors ready for use in injection molding or extrusion operations.

molding sand. See foundry sand.

mold-release agent. See abherent.

mole. The amount of pure substance containing the same number of chemical units as there are

tures that are beyond the range of liquid-in-glass thermometers. Their industrial applications include molten metals, fuel beds, ceramic kilns, furnaces, etc.; in laboratories they are used for both high-temperature and cryogenic research. They are also applicable to intermediate temperatures in cases where conventional thermometers are impracticable.
See also thermoelectricity.

thermodynamic potential. See Nernst potential.

thermodynamics. A rigorously mathematical analysis of energy relationships (heat, work, temperature, and equilibrium), the principles of which were first elaborated by J. Willard Gibbs in the mid-19th century. It describes systems whose states are determined by thermal parameters, such as temperature, in addition to mechanical and electromagnetic parameters. A *system* is a geometric section of the universe whose boundaries may be fixed or varied, and which may contain matter or energy or both. The *state* of a system is a reproducible condition, defined by assigning fixed numerical values to the measurable attributes of the system. These attributes may be wholly reproduced as soon as a fraction of them have been reproduced. In this case the fractional number of attributes determines the state, and is referred to as the *number of variables of state* or *the number of degrees of freedom* of the system.

The concept of *temperature* can be evolved as soon as a means is available for determining when a body is "hotter" or "colder." Such means might involve the measurement of a physical parameter such as the volume of a given mass of the body. When a "hotter" body, A, is placed in contact with a "colder" body, B, it is observed that A becomes "colder" and B "hotter." When no further changes occur, and the joint system involving the two bodies has come to equilibrium, the two bodies are said to have the same temperature. Thus, temperature can only be measured at equilibrium. Therefore, thermodynamics is a science of equilibrium, and a thermodynamic state is necessarily an equilibrium state. Thermodynamics is a macroscopic discipline, dealing only with the properties of matter and energy in bulk, and does not recognize atomic and molecular structure. Although severely limited in this respect, it has the advantage of being completely insensitive to any change in our ideas concerning molecular phenomena, so that its laws have broad and permanent generality. Its chief service is to provide mathematical relations between the measurable parameters of a system in equilibrium so that, e.g., a variable like pressure may be computed when the temperature is known, and vice versa.

thermodynamics, chemical. See chemical thermodynamics.

thermoelectricity. Electricity produced directly by applying a temperature difference to various parts of electrically conducting or semi-conducting materials. Usually two dissimilar materials are used, and the points of contact are kept at different temperatures (Peltier effect). Many temperature-measuring devices (thermocouples, thermopiles) work on this principle, since the voltage is proportional to the temperature difference. Metallic conductors are usually used for these "thermometers," which produce a rather small current. A newer use for the effect is as a source of electrical energy, i.e., a means of direct conversion of heat into electricity (or vice versa) without the use of a generator (or motor). The materials used for these thermoelectric couples are semi-conductors (e.g., tellurium; zinc antimonide; lead, bismuth, and germanium tellurides; samarium sulfide) or thermoelectric alloys, all of which produce relatively large currents. Several of these "cells" are then hooked in series much like the cells of a battery.

"Thermoflex" A [*Du Pont*]. TM for a rubber antioxidant containing 25% di-p-methoxydiphenylamine$(CH_3OC_6H_4)_2NH$, 25% diphenyl-p-phenylenediamine $C_6H_4(NHC_6H_5)_2$, and 50% phenyl-β-naphthylamine $C_{10}H_7NHC_6H_5$.
Properties: Dark gray pellets, d 1.21, fp above 67C.
Use: Tire carcasses, transmission belts, etc., to promote resistance to flexing at operating temperatures.
See also antioxidant.

thermofor. A heat-transfer medium.
See coolant.

thermoforming. (1) See reforming. (2) Forming or shaping a thermoplastic sheet by heating the sheet above its melting point, fitting it along the contours of a mold with pressure supplied by vacuum or other force, and removing it from the mold after cooling below its softening point. The method is applied to polystyrenes, acrylics, vinyls, polyolefins, cellulosics, etc.

Thermofor process. A moving-bed catalytic cracking process in which petroleum vapor is passed up through a reactor countercurrent to a flow of small beads or catalyst. The deactivated catalyst then passes through a regenerator and is recirculated.

thermogravimetric analysis. (TGA). The weight of a substance heated or cooled at a controlled rate, in thermogravimetry, which is recorded as a function of time or temperature. Frequently